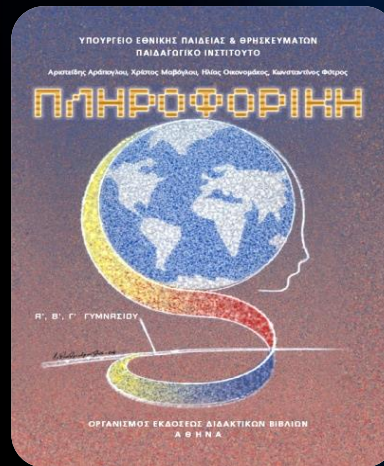


<http://www.zioulas.gr>



# MULTIMEDIA

## CHAPTER 3.1



**EVANGELOS C. ZIOULAS (IT TEACHER)**

# KEY WORDS



MULTIMEDIA

INTERACTIVITY

LINEAR & NO-LINEAR

BITMAP IMAGE

VECTOR IMAGE

RESOLUTION

COLOR DEPTH

RGB MODEL

# MULTIMEDIA = 5 MEDIA



- TEXT
- GRAPHICS
- SOUND
- ANIMATION
- VIDEO

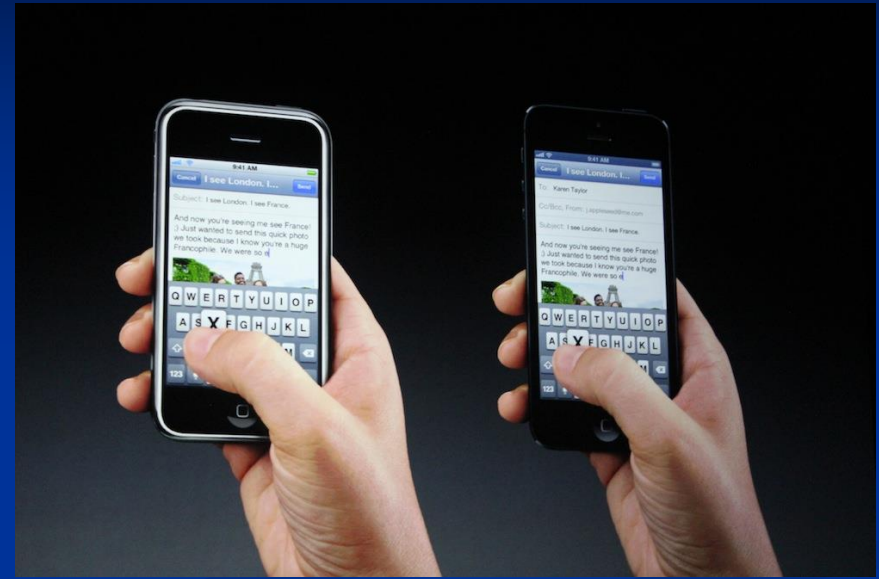
# MULTIMEDIA FEATURES

- It is a kind of technology that **combines** various forms of **media** in order to better represent the information provided to the user.

- **Text**
  - **Sound**
  - **Graphics Sound**
  - **Animation**
  - **Video**
- Media forms
- 

- In multimedia technology many pieces of information are interconnected in a **non-linear** way.
- It allows users to develop an **interactive** relationship with computers, so as to be able to select any kind of information needed.

# INTERACTIVITY



# NO-LINEAR APPLICATIONS

- The most important feature of multimedia technology is **interactivity** with which in a non-linear application, the user:
  - is **not a passive user** of application who just watches the information provided but he has also the ability to determine the way it is displayed.
  - is an active user who determines the **form**, the **order** and the **speed** of information each time he uses an application.

# EXAMPLES OF LINEAR & NO-LINEAR APPS

Linear	No Linear
School book	Educational software (e-books)
Encyclopedia	Electronic encyclopedia
Book pages	Webpages
TV channels	Computer, Web-TV
Video (VCR)	DVD Player

# NO-LINEAR WEB-SITES

The screenshot displays the Miniclip.com website interface. At the top left is the 'MINICLIP PLAY GAMES' logo. A search bar is located next to it. On the right side of the header, there are links for 'Signup', 'Login', and social media icons for Facebook, YouTube, and Twitter. Below the header is a navigation menu with categories: Action, Pool, Sports, Multiplayer, Stunt, Puzzle, iPhone, Motorsports, and Android. The main content area features a large 'Monster Trucks 360' game banner with a 'PLAY' button. To its right is a grid of smaller game thumbnails including Jacksmith, Club Penguin, MotoX Nitro, Bloons TD 5, Empire, 8 Ball Pool (marked 'UPDATED'), Space Heroes, and Turbo R 2. On the far right, there is a large advertisement for 'DRAKENSANG ONLINE' with the text 'NEA ΠΕΡΙΟΧΗ ATLANTIS' and 'ΑΠΕΡΕΣΤΡΩΤΗ ΚΟΡΤΙΚΑ'. Below the main content, there are more category-specific sections: 'Action' with games like Spellstorm, Stickman, Commando 3, and K Commando; 'Sports' with games like Free Running, Basketball, Ice Hockey, and Winter Games; and a large '8 POOL' banner for 'NEW TOURNAMENTS! SYDNEY Marina Bar'. Other game thumbnails like 'EMPIRE', 'CD Assault', and 'Overhaul' are also visible.



# NO-LINEAR APPLICATIONS

Google Earth interface showing a local search for "pizza" in Newport Beach, CA. The search results list several pizza places, with "B J's Restaurant & Brewhouse" selected. The info window for this restaurant displays its address (106 Main St, Newport Beach, CA 92661), phone number (949 675 7560), website (bisbrewhouse.com), and directions. A sponsored link for "Newport Beach Ca" is also visible.

**Search Results:**

- B J's Restaurant & Brewhouse**  
949 675 7560 - 1.3 mi NE
- California Pizza Kitchen**  
949 759 5543 - 2.9 mi NE
- IL Farro Caffe Trattoria**  
949 723 5711 - 1.4 mi NW
- Mutt Lynch's**  
949 675 1556 - 1.5 mi NW
- Z Pizza**  
949 723 0707 - 2.0 mi N
- Pizza Bakery**  
949 631 1166 - 2.6 mi N
- Z Pizza**  
949 715 1117 - 5.1 mi E
- Laventina's Big Cheese Pizza**  
949 675 1980 - 1.7 mi NW
- Tony Maroni's Famous Gourmet Pizza**  
949 252 8877 - 6.4 mi NE

**Info Window for B J's Restaurant & Brewhouse:**

**B J's Restaurant & Brewhouse**  
949 675 7560  
106 Main St  
Newport Beach, CA 92661, United States  
[bisbrewhouse.com](http://bisbrewhouse.com) - 50 more »  
Directions: [To here](#) - [From here](#)

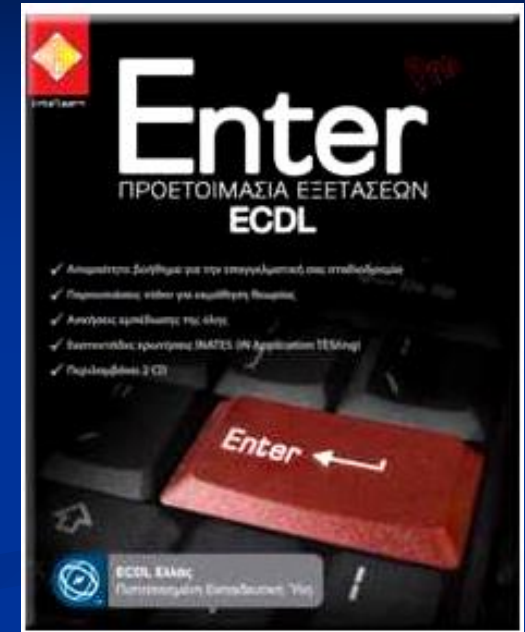
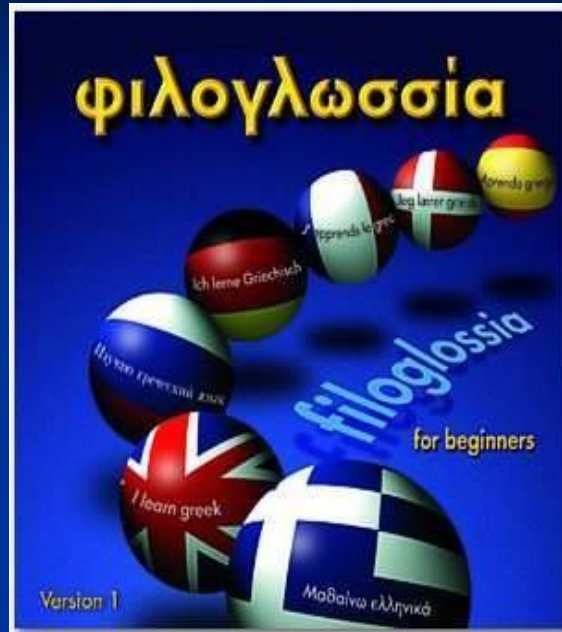
Sponsored Link  
**Newport Beach Ca**  
Guide for Hotels, Real Estate, Weather, Maps, Yellow & White Pages  
[www.areaguides.net](http://www.areaguides.net)

# ELECTRONIC ENCYCLOPEDIAS

# EDUCATIONAL SOFTWARE



# EDUCATIONAL SOFTWARE



# MULTIMEDIA EQUIPMENT

- Nowadays, there is a wide variety of **input** and **output devices** that act as additional equipment for multimedia technology so to create a virtual environment for the user (3D environment), making his work more attractive and more impressive.
- These multimedia devices include:
  - special joysticks
  - electronic gloves
  - stereoscopic glasses
  - large screens & video projectors
  - high performance audio systems



# MULTIMEDIA EQUIPMENT



# MULTIMEDIA EQUIPMENT



# MULTIMEDIA APPLICATIONS

## ■ EDUCATION

- (educational software, virtual labs)

## ■ ENTERTAINMENT

- (electronic games with 3-D graphics and sound effects)

## ■ TOURISM – INFORMATION

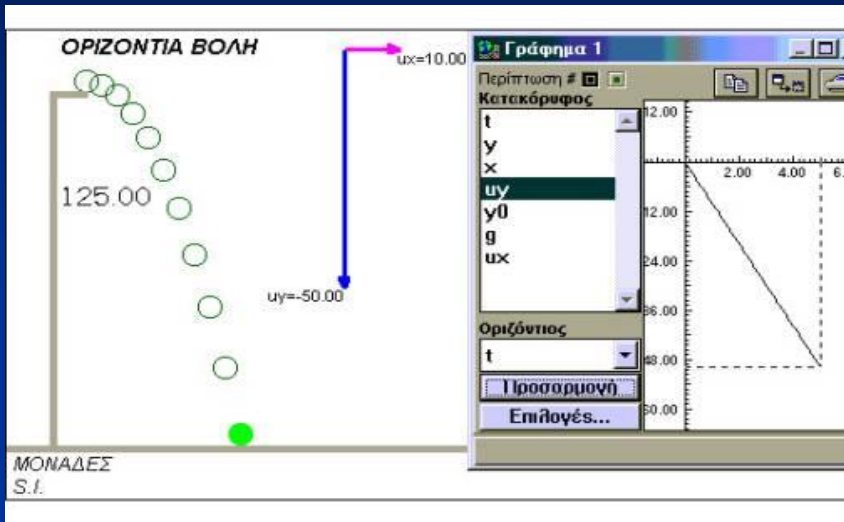
- (info-kiosks placed in airports, train stations, museums etc.)

## ■ ADVERTISING - SALES

- (on-line stores for shopping and market research)



# MULTIMEDIA APPLICATIONS



# MULTIMEDIA APPLICATIONS

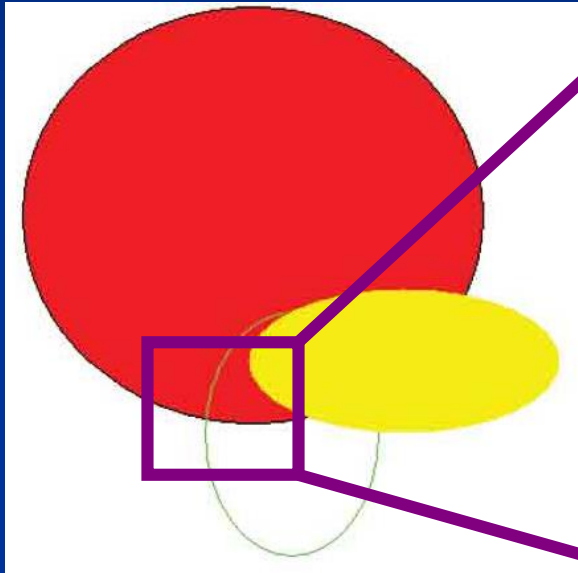
## PC-GAMES



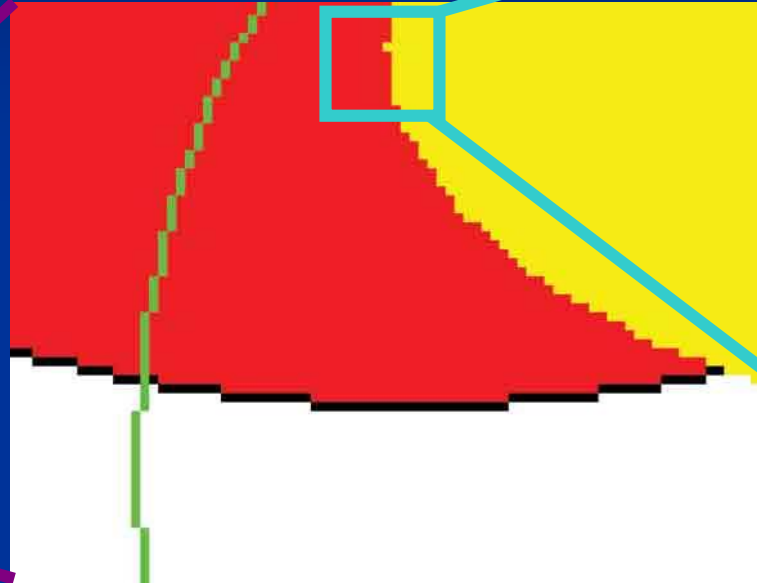
# GRAPHICS - IMAGES

- When an image is **digitalized**, it is represented as a **bitmap** (map of bits, **.bmp** files), that means as a number of **pixels** (picture elements) on the screen each of which carries a specific color.
- Image digitalization can be done either through software (e.g. Windows Paint, Photoshop etc.), or hardware input (e.g. scanner, digital camera etc.).
- **Magnification** of a bitmap image leads to quality deterioration, showing sharp defects (coloured square areas are more intense).

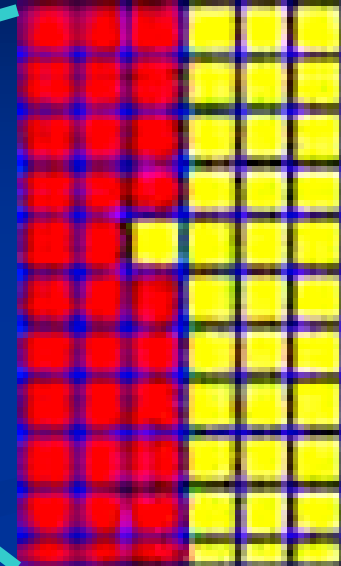
# IMAGE RESOLUTION



A bitmap image created by Windows Paint



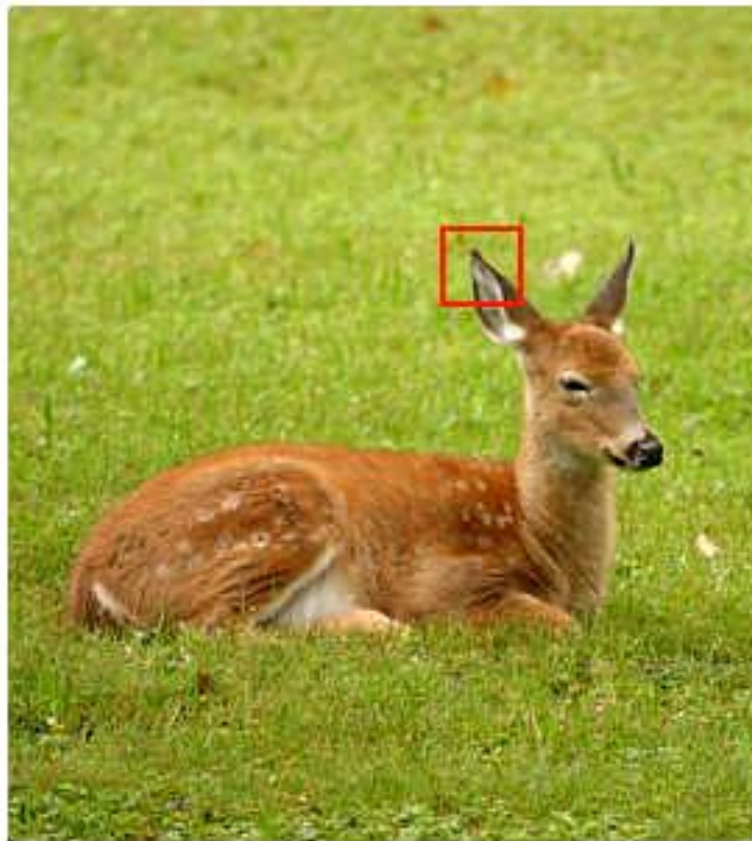
A magnified part of the image



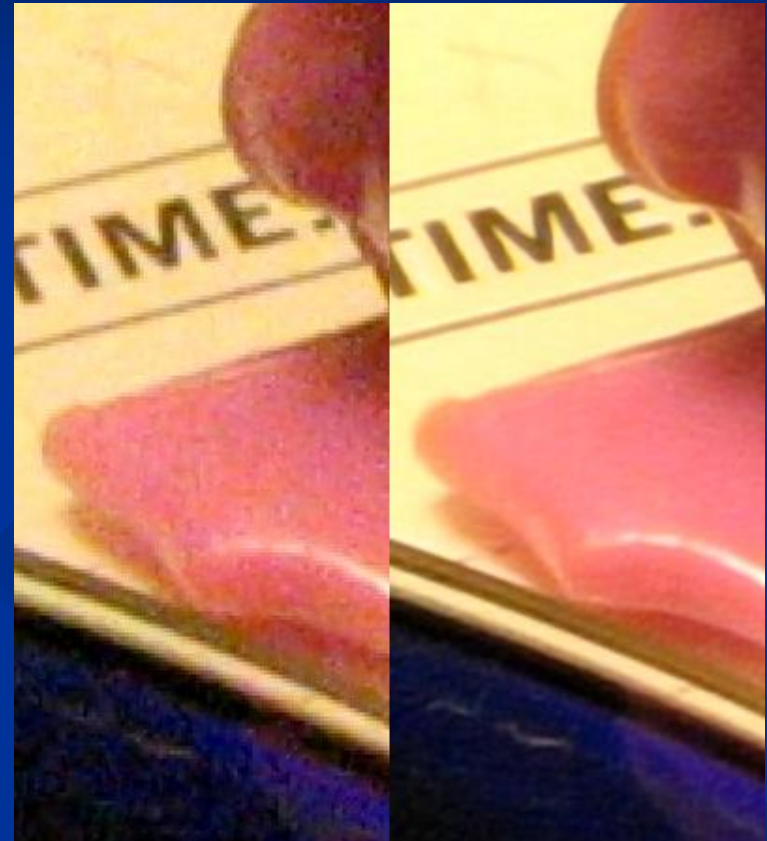
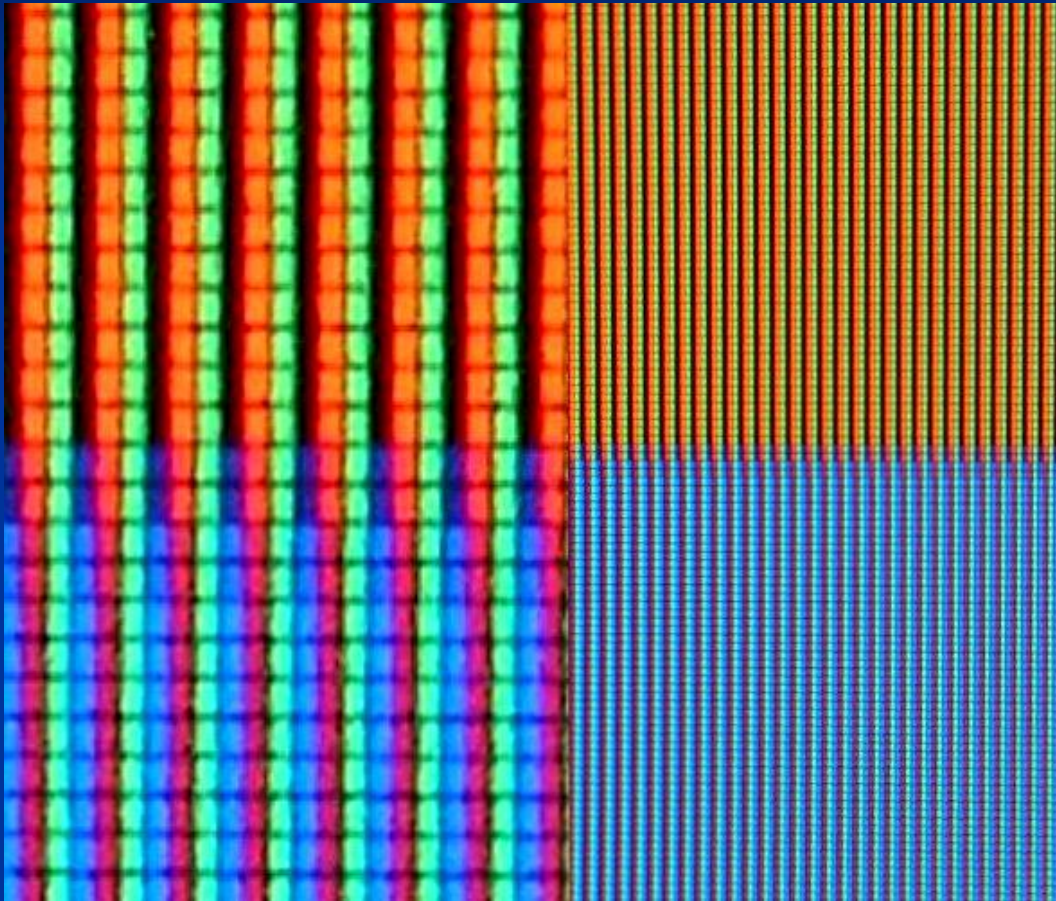
More detail is shown by the image magnification

The **number of pixels** that constitute an image **in each dimension** e.g. 372x175 is known as image resolution. The more pixels on an image, the more detailed it is. This allows users to enlarge it as much possible.

# IMAGE RESOLUTION (PIXELS)

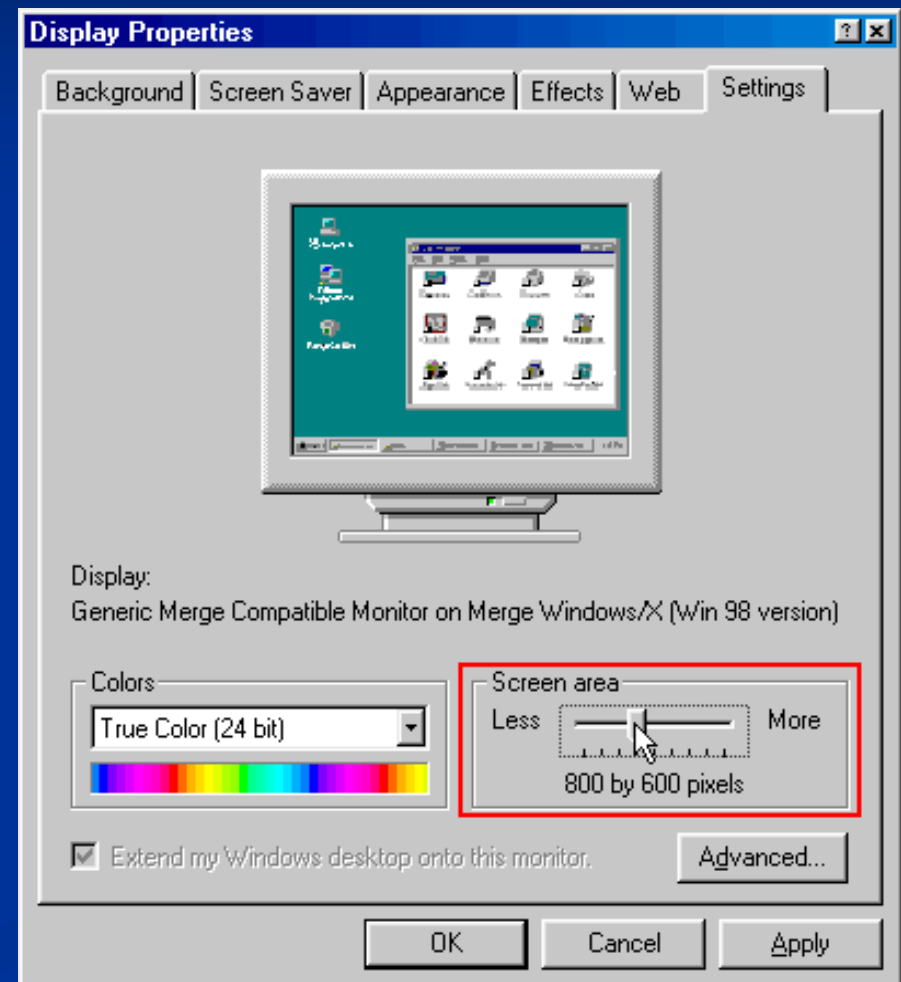
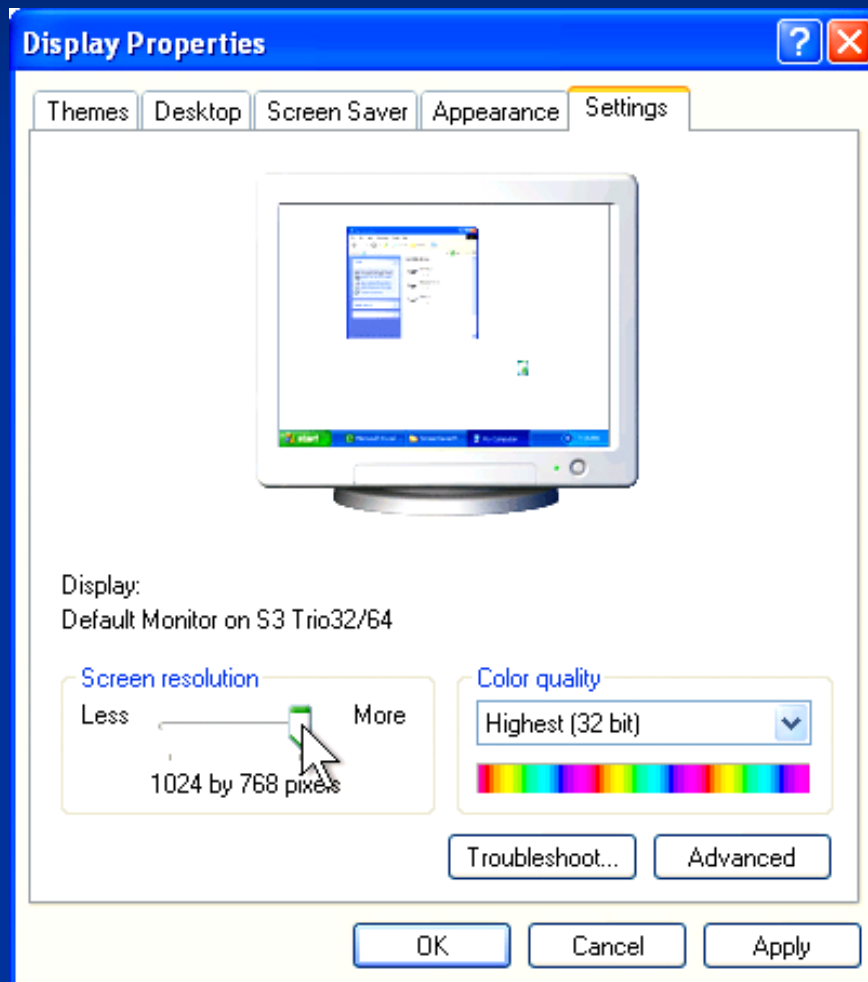


# IMAGE RESOLUTION



# CHANGE THE SCREEN RESOLUTION

Desktop → Right Click → Properties → Settings

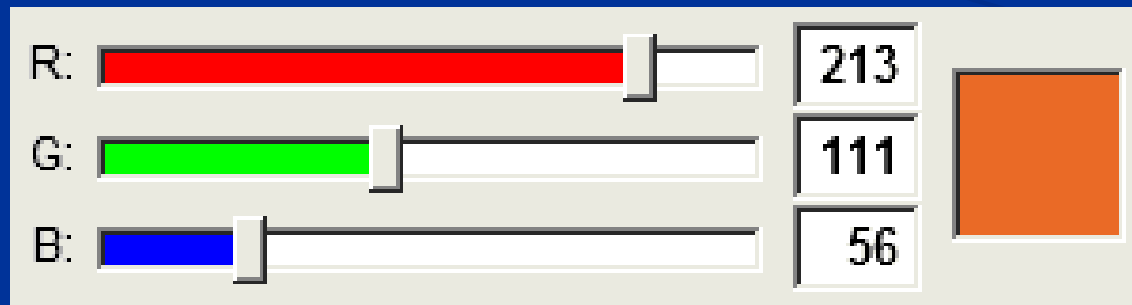
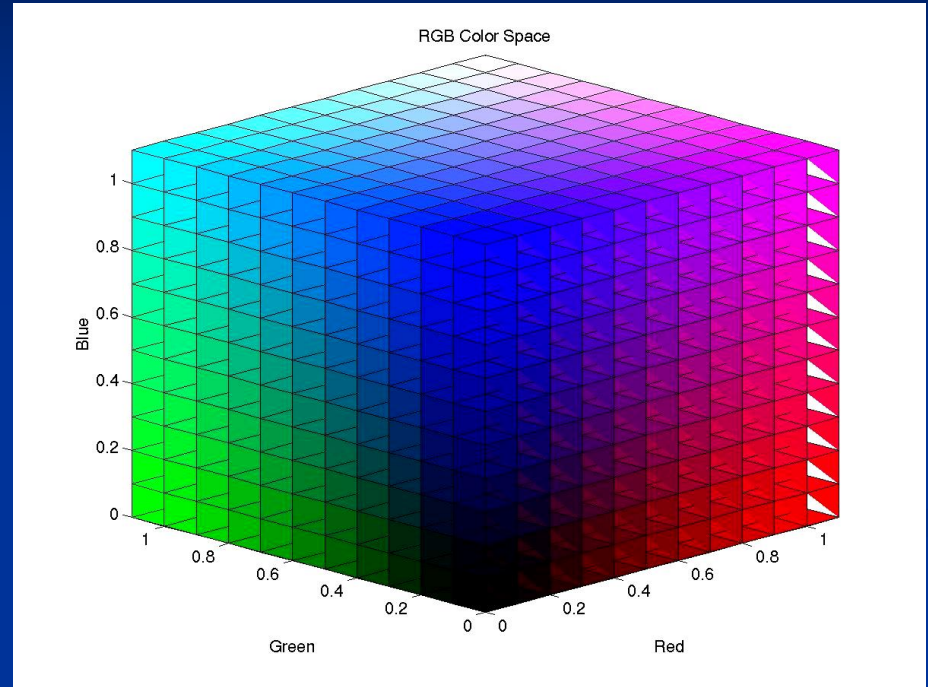
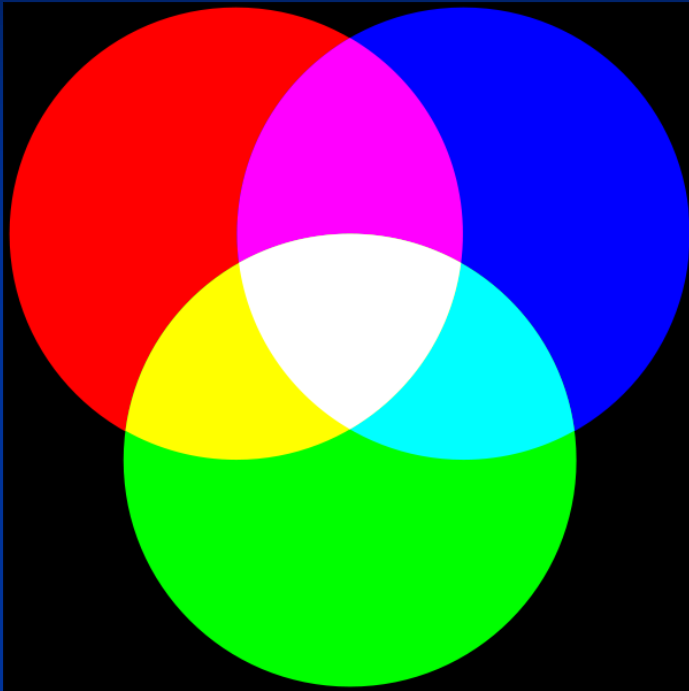


# COLOUR MODEL

- Each pixel on the screen carries a specific colour which is produced by the combination of 3 basic colours (**RGB model**).
- The basic colours of an RGB model are **Red**, **Green** and **Blue**.
- Each shade of 3 basic colours corresponds to a specific **binary number** (each number is between 0 - 255).



# COLOUR MODEL (RGB)



# COLOUR DEPTH

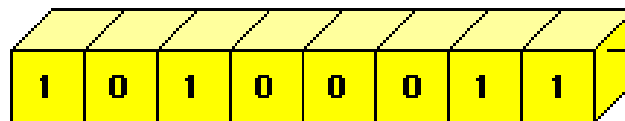
- The **number of bits** which are used to represent the colour shade of an individual **pixel** are known as color depth.
- It also indicates the **number of different colours** a computer uses to cover the area of the screen.

Color Depth	Number of Colors
8 bit	256
16 bit	65.536
24 bit	16.777.216
32 bit	4.294.967.296

# COLOUR DEPTH

## 8-bit or 256 color displays

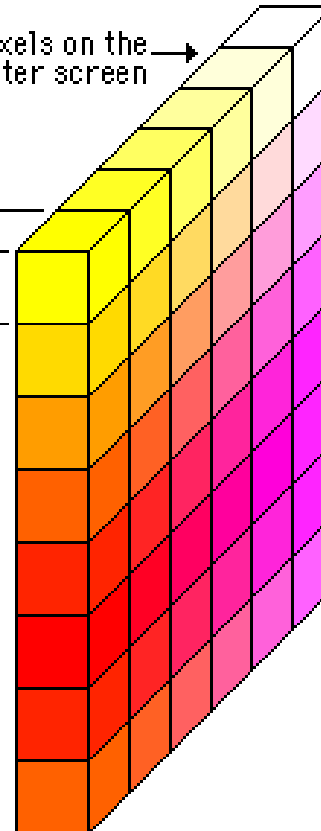
Each screen pixel is represented by eight bits of memory.



256 colors (Color Look Up Table)



Pixels on the computer screen →

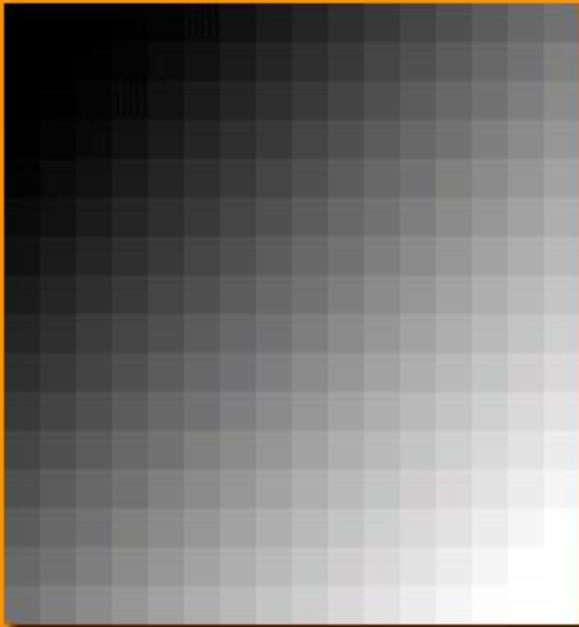


# COLOUR DEPTH

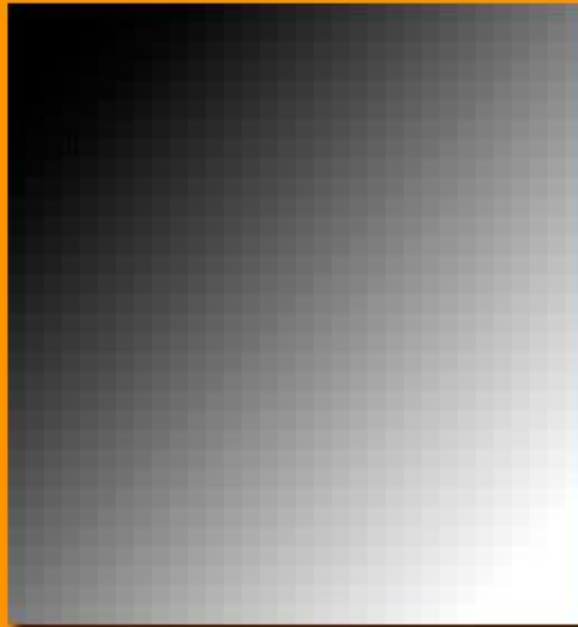
32 bit color

16 bit color

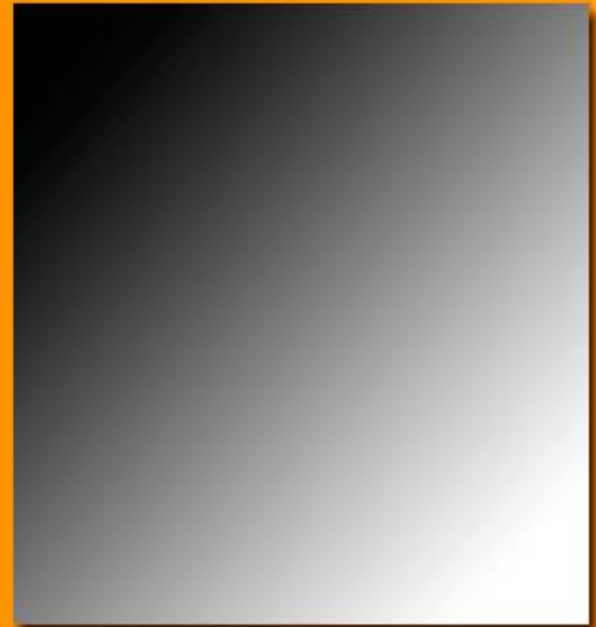
# COLOUR DEPTH



**8-bit color**



**10-bit color**



**16-bit color**

# IMAGE SIZE

- The **number of bytes** occupied by an image file in a storage device such as a hard disk are referred to as image size.

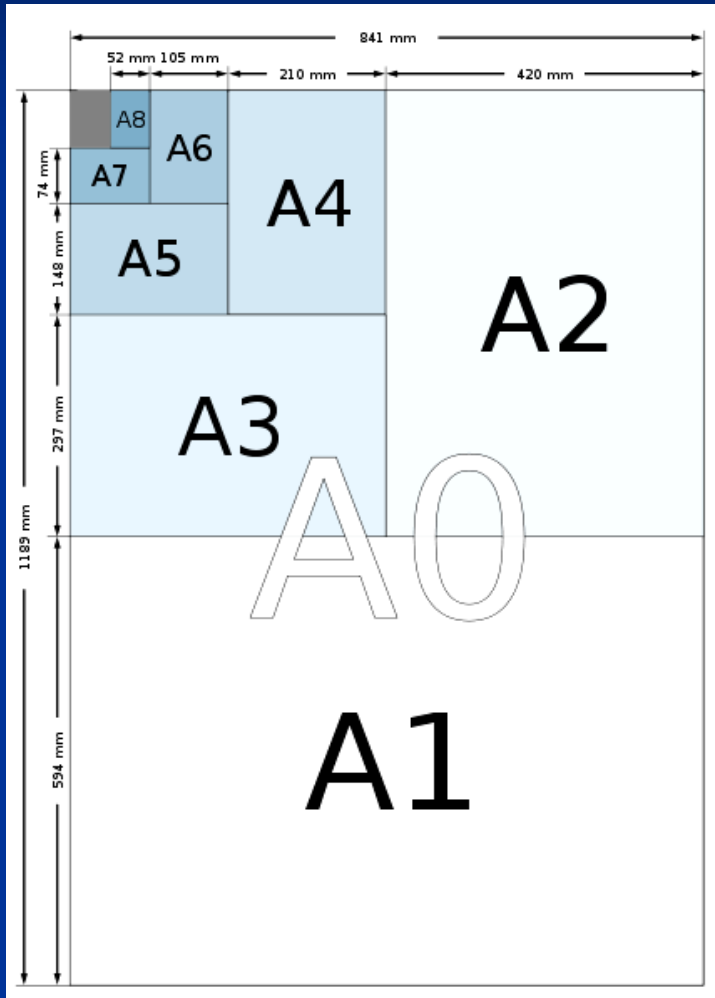
Calculate Image size



Image Size = (Pixels Horizontally) \* (Pixels Vertically) \* (Color Depth) : 8 bytes

e.g. an image with resolution **1024x768** color depth **16 bits**, needs capacity  $(1024 * 768 * 16) : 8 = 6.291.456$  bytes (image size)

# IMAGE SIZE

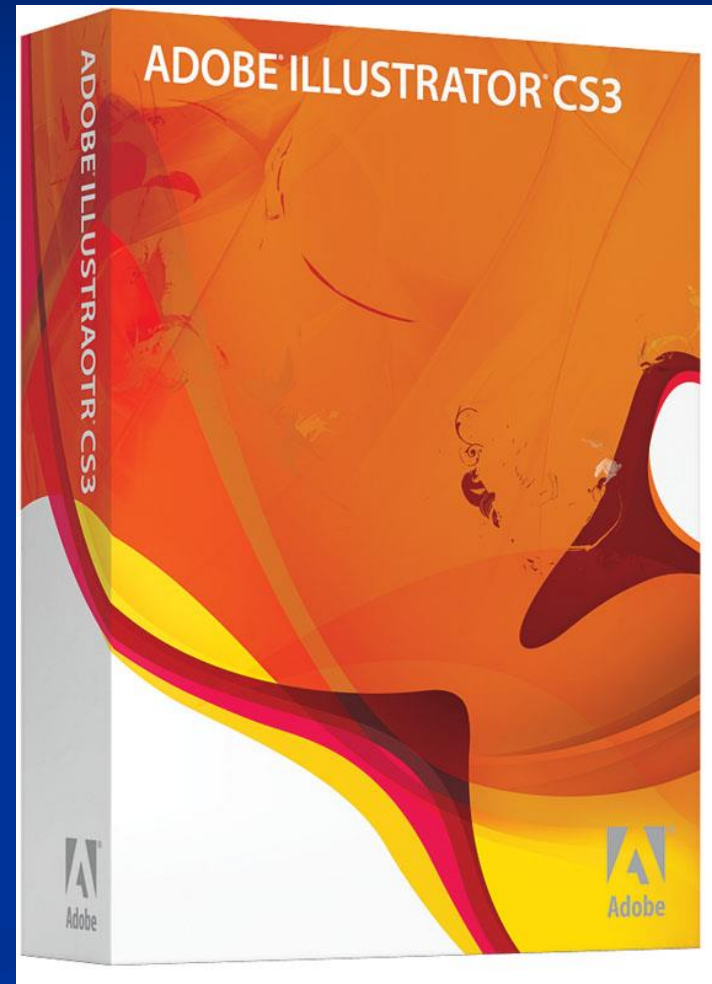
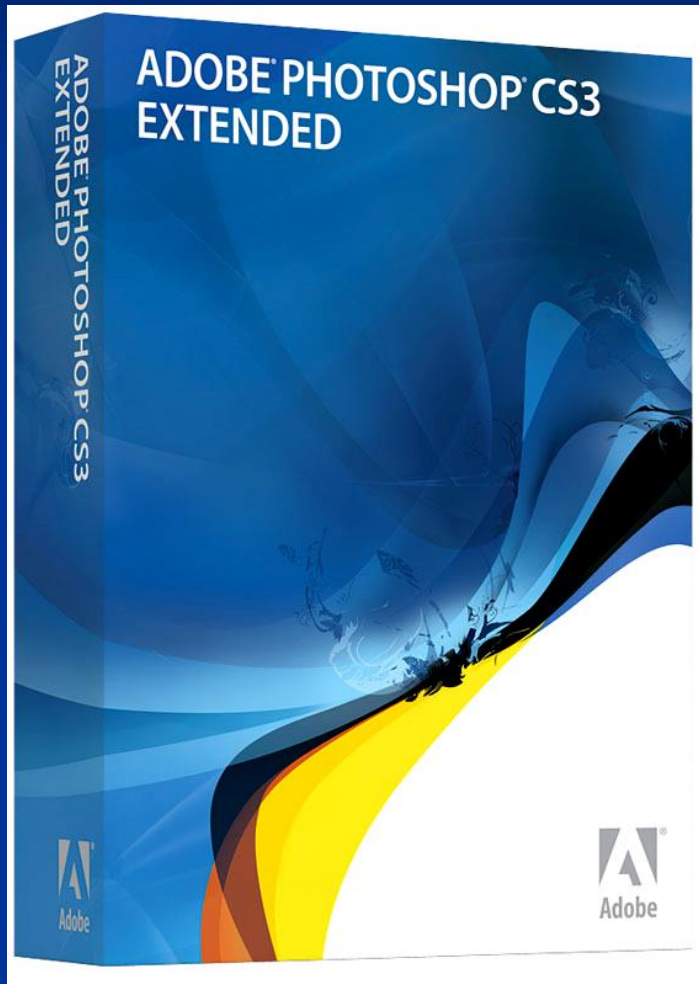


The screenshot shows the 'Ιδιότητες' (Properties) dialog box for a file named 'PC%20Care.JPG'. The 'Γενικά' (General) tab is selected. The file's properties are as follows:

- Πρωτόκολλο: Πρωτόκολλο μεταφοράς υπερκειμένου
- Τύπος: JPEG Image
- Διεύθυνση (URL): [http://service.sympatico.ca/img\\_gallery/PC%20Care.JPG](http://service.sympatico.ca/img_gallery/PC%20Care.JPG)
- Μέγεθος: 26302 byte (highlighted with a red circle and a red arrow)
- Διαστάσεις: 659 x 500 pixels
- Δημιουργήθηκε: 11/05/2008
- Τροποποιήθηκε: 11/05/2008

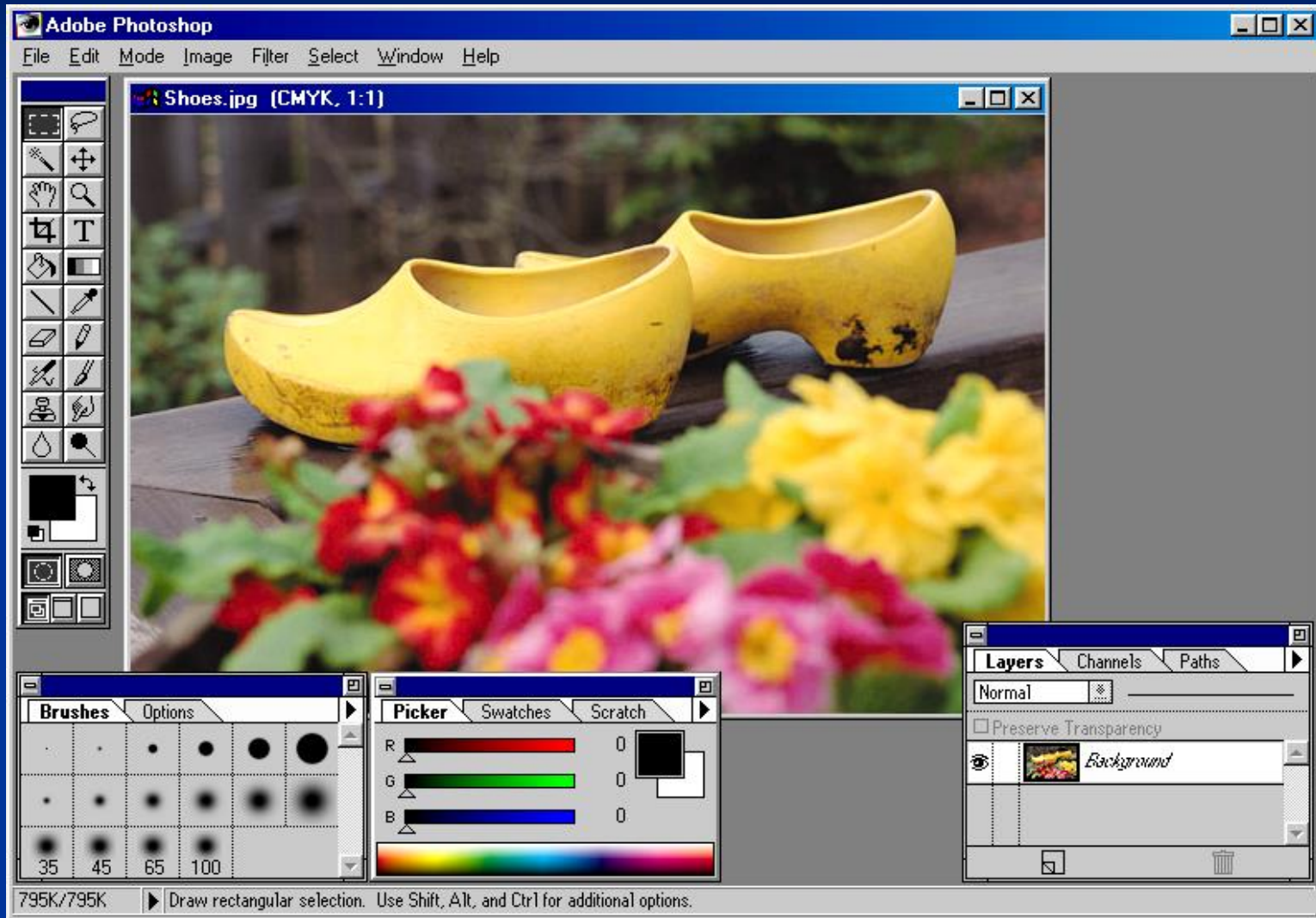
At the bottom of the dialog box, there are three buttons: 'OK', 'Άκυρο' (Cancel), and 'Εφαρμογή' (Apply).

# IMAGE PROCESSING

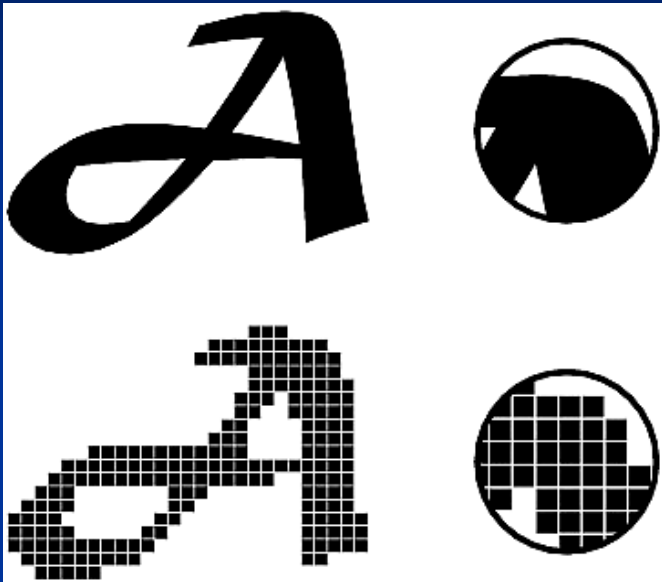




# IMAGE PROCESSING



# TYPE OF IMAGES



## BITMAP IMAGES

They are images **consisted of pixels** (map of bits) and can be distorted when magnified.



## VECTOR IMAGES

They are small images that **consist of geometrical shapes** (points, lines, rectangles, ellipses, polygons etc.), which retain their quality after magnification.